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CONTINGENCY MANAGEMENT IN THE MODIFICATION OF VERBAL BEHAVIOR IN DISADVANTAGED CHILDREN.

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IN A SPECIALLY ORGANIZED NURSERY SCHOOL SETTING, DISADVANTAGED CHILDREN BETWEEN TWO AND ONE-HALF AND THREE AND ONE-HALF YEARS OF AGE, EXPERIENCED CONTINGENCY MANAGEMENT (CM) PROCEDURES TO MODIFY VERBAL BEHAVIOR. IN ONE ROOM OF A LARGE, PRIVATE DWELLING CONVERTED INTO A NURSERY SCHOOL, REQUISITE ANTECEDENT BEHAVIORS (RAB) WERE ESTABLISHED IN EACH CHILD, WITH REINFORCEMENT PROVIDED BY THE DISPENSATION OF METAL WASHERS. TOPOGRAPHICAL ACCURACY OF THE CHILD'S RESPONSES WERE ENCOURAGED THROUGH THE SIMPLEST, MOST DIRECT CONTROLS. RESPONSES WERE THEN BROUGHT UNDER THE CONTROL OF OTHER, MORE REALISTIC STIMULI. SKINNER'S TERMS "TACT" AND "MAND" ARE UTILIZED TO DESCRIBE A TYPICAL SESSION ON TACT TRAINING. A CRITERION TEST WAS ADMINISTERED AND THE DESIRED BEHAVIOR WAS REACHED WITH ALL SUBJECTS AFTER A MEAN OF SIX SESSIONS. CONTINGENCY MANAGEMENT PROCEDURES AND TOKEN ECONOMY ARE BELIEVED TO BE HIGHLY EFFECTIVE IN MAINTAINING AND STRENGTHENING MODIFIED VERBAL BEHAVIOR. IT WAS CONCLUDED THAT--(1) DISADVANTAGED CHILDREN RESPOND TO CM PROCEDURES AS WELL AS MIDDLE CLASS CHILDREN DO, (2) THE STRATEGIES INVOLVED IN RAB TRAINING AND TRANSFERS TO GENERAL GROUP ACTIVITIES APPEAR TO BE SOUND, AND (3) VERBAL BEHAVIOR IN VERY YOUNG CHILDREN APPEARS TO BE AMENABLE TO MODIFICATION UNDER CM PROCEDURES. THIS PAPER WAS PRESENTED AT THE AMERICAN PSYCHOLOGICAL ASSOCIATION CONVENTION, WASHINGTON, D.C., SEPTEMBER 1, 1967. (PR)

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# CONTINGENCY MANAGEMENT IN THE MODIFICATION OF VERBAL BEHAVIOR IN DISADVANTAGED CHILDREN*

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Principles of contingency management have recently acquired prominence with special regard to their application in the modification of the behavior of young children in classroom settings. This report concerns itself with recent explorations of three aspects of contingency management: 1) in an especially organized nursery school setting; 2) designed for a distinctive population of children, namely, those that have been characterized as "disadvantaged" in terms of their socio-economic status and all the attendant properties of a poverty-marked environment (These children represent the target population of Project Head Start); and 3) for the modification of a special class of behaviors, i.e., verbal behavior.

The nursery school, named the Child Language Development Center, was organized to follow a number of specific strategies. These strategies were directed towards the optimal utilization of conventional preschool space and play-apparatus endowments for the application of CM procedures. A further goal was to

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provide a setting for systematic experimentation with the expansion and refinement of children's verbal behavior in ways that could be made easily compatible with the kinds of space and apparatus available outside the laboratory to the community at large.

Although the target population for the work reported here is identified as "disadvantaged," the management of a preschool intended for this population raises issues and problems that are common to any and all preschool settings, and indeed to formal school settings of any primary level. One critical issue in educational training programs is that of individual vs. group instruction. While it is generally admitted that, for most purposes, individual instruction is more rapid, problems of economy and availability of personnel have almost universally made formal, school-based, instruction a group enterprise. Since the development of social interactions is ordinarily considered a part of any preschool activity, however, the functioning of the class as a group may not be overlooked.[1] As a

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1. An important distinction must be made between those activities which are truly "group" in that the behaviors are emitted in chorus, those that involve multiple participation in a sequentially dependent fashion, and those that represent individual responses (and perhaps feedback from the teacher) that are sequenced simply because the teacher can only "call on" one child at a time. In this common arrangement, instruction is offered on a one-to-one basis, with the rest of the class members waiting their turn.

consequence of the points just raised, it became an explicit goal of the management of the nursery school to sort out those behaviors which were most appropriately shaped in a one-to-one instructional setting from those which were inherently group-based. Further distinctions were made between the shaping of a novel behavior, bringing the behavior to high strength, bringing established behaviors under novel stimulus controls, and the shifting of controls from the adult teachers to the children themselves.

The physical environment, designed to support the general strategy of building behaviors in the most appropriate settings, consisted of three distinct areas. On the main floor of a large private dwelling a living room area functioned as a large playroom; adjacent to this was a smaller room that had been the dining room of the house, and which was used as a lunch room and for play activities involving clay, paint and water. These areas were furnished with child-size tables and chairs, commonly used preschool play equipment such as blocks, dolls, toys, etc., and closely approximate a conventional nursery school. On the second floor of the house a small bedroom was modified to provide a discrete quiet space for what can be called "micro-instruction." Analysis of complex activities in a schoolroom setting permits the identification of what are seen as Requisite Antecedent Behaviors or RAB's.

In the room just referred to, small "bits" of these Requisite Antecedent Behaviors are established in each child, and the room has been christened the "RABbit Room." The RABbit Room served as the carefully controlled and monitored experimental space and as a specialized teaching environment. All sessions were observed through a large plate glass viewing screen, and were recorded on videotape. These videotape recordings permit an experimenter to study objectively his own behavior as an E, offer a rare opportunity for unusually fine-grained analysis of behavior, and provide a valuable source of teaching and demonstration material. Figure 1 shows a view of the recording apparatus on the observer's side of a partition, and the monitor screen gives a view of the worktable at which the child and the teacher sit.

In addition to the small table and chairs, the RABbit Room is equipped with the following apparatus: 1) a token dispenser designed to dispense metal washers, 3/4 inch in diameter; 2) a number of reinforcement devices that are operated by the insertion of a washer-token in a slot. All of the devices have in common the fact that they provide timed, self-terminating, periods of presentation of audio-visual events that have been found to be supportive consequences for children. For all sessions the devices consisted of:

the Twinkle Box (Figure No.2.), which offers a three-second display of randomly flashing red and green star-patterns on an eight by eight inch screen, accompanied by relay clicks, when the token has been inserted in the slot; the Movie Box, which projects an animated cartoon film on a four by six inch screen for an eight-second interval; the Slide Box, which projects a sequence of 35 mm color slides on a four by four inch screen. Upon insertion of a token, a slide is projected for five seconds, and the screen goes blank. The next token produces a new slide for five seconds, and so on. The subject matter of the slides includes a series of brightly colored "picture book" illustrations of kittens, dogs, toys, and small children, and a series of color photographs taken of the children during a picnic in the park.

Primary activities in the RABbit Room included such RAB's as entering the room, going to the worktable and sitting down without verbal direction, responding to the E's "Good morning!" with a matching "Good morning!", and attending to the E, accepting, storing and spending the tokens that were administered, returning without prompting to the task area, and sitting down again.

The central focus of the work reported here is the modification of verbal behavior of children between two and one-half and three and one-half years old. The

fact that the behavior to be modified is verbal introduces several dimensions of difficulty that tend to make efforts in this direction like raising one's self by one's bootstraps. Modification of behavior in an educational setting relies heavily, if not exclusively, on verbal $S^DS$ and verbal consequences. When we are dealing with young children whose verbal behavior on the receptive and productive levels is markedly limited our verbal access to the organism is considerably reduced. If the child's receptive language is deficient, we can hardly "explain" to him what it is we want him to understand. If his productive repertoire is limited, his attempts to control the teacher and his classmates are likely to emerge as direct, physical controls. If his vocal topography is idiosyncratic, his attempts to control his social environment verbally ... successful at home ... will fail in school, and generate a host of maladaptive responses, some of them visceral. A further problem of much concern relates to the fact that, in the main, an organism's verbal behavior operates on other organisms. In the analysis of operant behavior in human and infra-human organisms, the properties of the operandum are recognized as being critical. In the case of verbal operant behavior, we are involved with shaping behaviors in the presence of human operanda that continually vary in countless

physical dimensions, in sensitivity, in response latency, and that are programmed for constantly shifting schedules. Small wonder, then, that criterion behavior is so long in developing!

In an attempt to cope with some of the problems specific to the modification of verbal behavior, a number of strategies and application procedures have been developed. The basic strategy underlying all the others is based on the observation that while the functional efficiency of a child's verbal behavior is determined by the topographical accuracy of his responses <u>together</u> with their appropriateness to the control stimuli present, attempts to refine both topography and stimulus control at the same time are inefficient. The basic approach has been toward establishing and refining the topography under the simplest, most direct controls, regardless of their approximation to the stimuli that will eventually be expected to control the response in question, and then focusing our efforts on bringing an already established response topography under the control of other, more "realistic" stimuli.

The selection of classes of function, both of responses and control stimuli were made on these criteria:

1) Control stimuli for the responses should be present in multiple settings. This requirement is a

necessary antecedent to the "generalization" of the response across varying settings and contingencies.

2) "Productivity" on the levels of "word" or "syntax." Ss were shaped, for example, to tact the reinforcing devices in the RABbit Room as "the movie box," "the slide box," and "the twinkle box." "Box" is a high frequency item seen as a word: "Movie box, slide box, etc." lead to "____ box," which is a general frame for a specific structural form, e.g., "coin box" ... a specific, and "book shelf," "salad bowl," "soup bowl," etc., which is a general structural frame.

3) Extendability of function ... tact $\overleftrightarrow{}$ mand. The terms "tact" and "mand," coined by Skinner, respectively imply the function of verbal "touching," or contacting the environment, and the function of directing, or "commanding" a change in the speaker's environment. There is, however,a formal ambiguity in the terms "tact" and "mand," since their function is often not determinable by an analysis of the completed response. For example, "Give me a lollipop." is clearly a mand, while "That's a lollipop." can be viewed as a tact. Responses of the highest frequency in verbal interaction are, however, seldom "complete

sentences." The response "A lollipop." is the accepted, common response to both of these questions: 1) "What's this?" and 2) "What do you want?" The responses to both questions as "A lollipop" are formally identical, but the first response to (1) would be called a tact, and the response to (2) would be a mand. Describing this situation as "formal ambiguity" has clear negative implications, but if we look at the same situation as representing "functional multiplicity," we find an element of strategic utility.

A representative view of the analytical rationale and the CM procedures can be found in brief description of a typical session that focuses on special and general training in tacting.

The special training referred to here is related to "names." It is worth noting the importance of the use of the names of children and adults in effective social behavior in a pre-school setting. Observation in a number of nursery schools revealed, nonetheless, that after periods of three and four weeks of attendance the children did not demonstrate secure control of the names of all of their classmates, and even, in many instances, the teacher(s). Rather than leave the learning of the names of classmates and teachers, and the effective use of these names, to the realm of "what children

eventually learn after n weeks in school," the establishment of these desirable behaviors was incorporated into the goals of "tacting training."

Photographs of all the children and the staff were mounted on four by four inch squares of Masonite and laminated in clear, waterproof plastic. These picture cards were utilized in matching games in the play area and as place markers in the play and dining areas in addition to their primary use in the RABbit Room.

In Figure 3 , Cindy, a three-year-old, is identifying by name each member of the staff. Her responses, such as "Barbara, " "Bruce," "Mike," etc., are under the control of "Who is this?" and "Whose picture is this?" The acceptability of responses varies, under shaping, but each acceptable response is reinforced by the administration of a token. In initial sessions involving adaptation to the RABbit Room and the reinforcement devices, each token was "spent" in a reinforcement device immediately after it was received. By the third session, however, Ss were shifted to a complex schedule of token reinforcements and subsequent contingencies for their "spending." The left edge of the table in Figure No. 3 shows the child's storage of tokens in what was labelled a "train." After each token was received, verbal praise was supplied, and the child stored her token until

identification of all the pictures was complete. When all the pictures had been identified, E picked up the tokens from the table and accompanied S to the bank of reinforcement devices. The first contingency to be met here was the child's indicating the device she wanted to use. Pointing was shaped to actual naming, and when the child says "Slide box" she is given a token. Depositing the token she sees a color slide. She is then asked "What's that?" After naming the subject of the slide, e. g., "A puppy," she is reinforced with verbal praise and confirmation, e.g., "Good girl! Yes, that's a puppy!" followed by a repetition of the initial contingency ... "Now, where do you want to put the next token?" An appropriate naming of the Slide Box yields the next token, and the view of the slide. Correct naming of the color slide leads to the original question, and another opportunity to name the device.

Terminal behavior in this sequence produces the responses "in the Twinkle Box," "in the Slide Box," or "in the Movie Box." The criterion test, which was met by all children, consisted of the introduction into the RABbit Room of a completely novel reinforcement device ... the Contingent Sink, which produces a three second flow of water from a spigot upon insertion of a token. (Figure 4.). After spending tokens in one or more of the familiar devices

the child was shown the sink. "Sink" was presented as a model for an echoic response, and repeated, if necessary, until the child produced an acceptable approximation of the work "sink." This was then followed by the question "Where do you want to put the token?" The criterion response was "in the sink." Criterion behavior in terms of this measure, and in terms of other tacting behaviors was reached with all Ss with a mean of six sessions in the RABbit Room.

A vital notion in the overall experimental design is that relating to the generalization and extension of individually shaped behaviors to the group, preschool setting. The number of activities in which these extensions were accomplished is too long to detail here, but a number of examples of the introduction of contingency management to a conventional nursery school, or preschool, setting can be given. Figure 5 shows a child in a training session for "Right" and "Left." When he points in the appropriate direction, the teacher's aide will spin the Tub. Figure 6 shows the same device being used for shaping sequential verbal output on the part of the children. The teacher is making the contract here, and when the contract has been filled, she will spin the tub. Figure 7 shows the combination of a number of commonly used playthings for an elaborate, multiple contingency game. Having met a

contingency for a bit of verbal behavior, and received a token from a teacher's aide, a child is seen starting through the tunnel. The teacher at the other end has collected the tokens of the two girls, and set another verbal contingency. The girls have met the second contingency, and one is walking on an inverted rocking boat, while the other is on the elevated slide on the way to the ladder, her descent, and the return to the beginning of the cycle. Figure 8. gives an example of a dual extension of contingency management procedures ... first to the dining room, mealtime setting, and second to the shift of the children themselves to the role of contingency manager. Vincent has a cookie in his left hand for which he has exchanged his blue token. He has exchanged his red token (visible in the dish in the lower left) for the dish of ice cream which Kim is handing him. An extension of the tacting of picture cards by name was made to printed names. ( Figure 9. ) Laminated Masonite rectangles, similar to the picture cards, were prepared with the name of each child. In addition to their use in the RABbit Room, these cards were used as place markers at meal, and other, times.

The experience of the transfer of contingency management procedures to the general school area, as

well as the functioning of Token Economy during play and meal times can be summarized as being highly effective in maintaining and strengthening the children's verbal behavior as well as in providing manifold opportunities to contract for model-echo behaviors designed to increase the children's articulatory accuracy.

Among the most prominent conclusions drawn from the experiences reported here are the following:

1) Disadvantaged children do not display any striking differences in their response to CM procedures that have been successfully applied to middle-class children.
2) The strategies involved in RABbit training and subsequent transfer to general, group activities seem to be sound.
3) Verbal behavior in very young children appears to be amenable to modification under CM procedures.

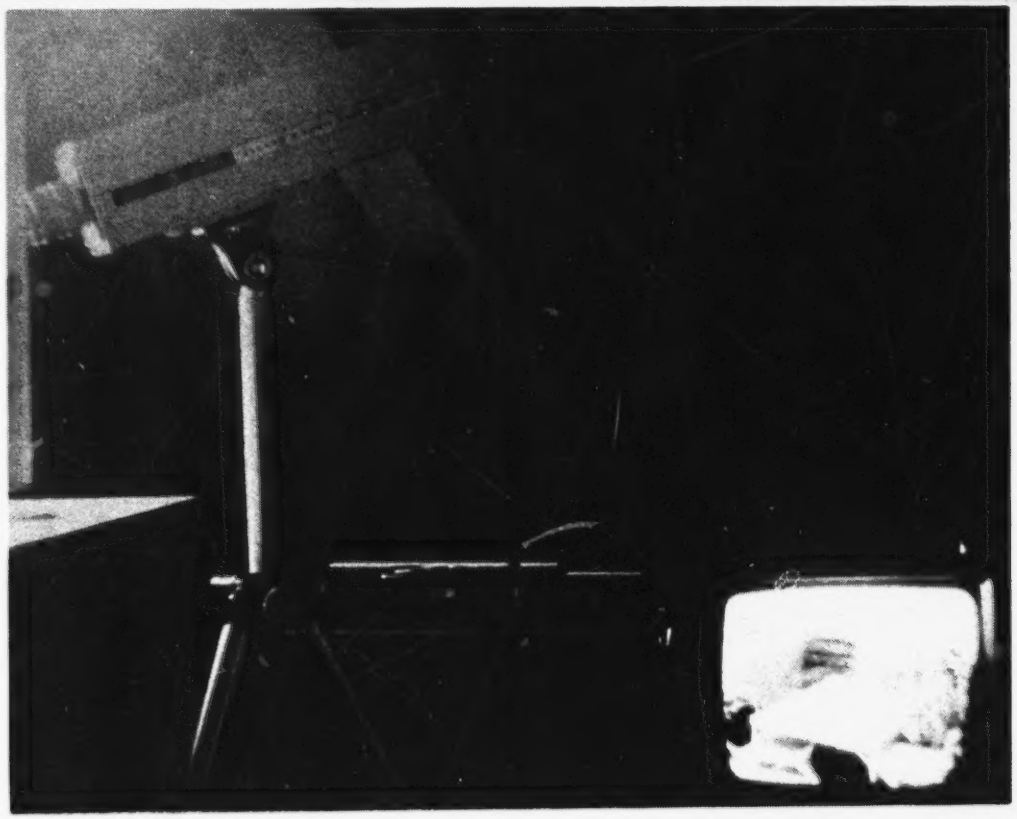

Figure 1

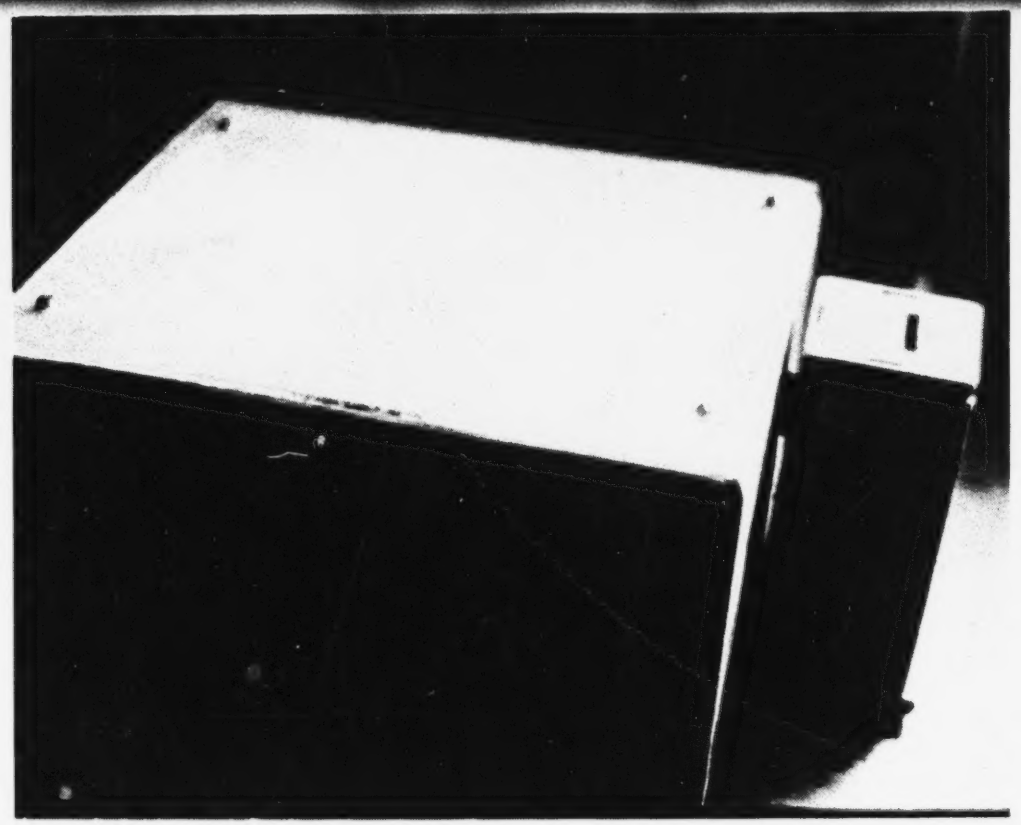

Figure 2

Figure 3

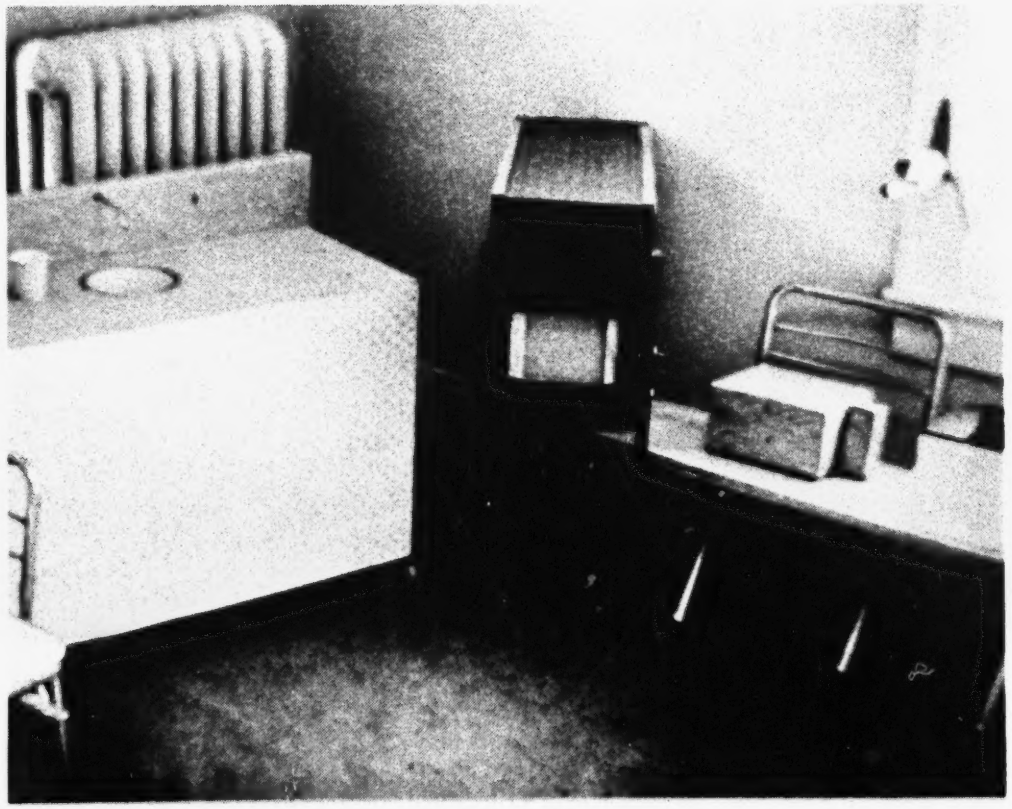

Figure 4

Figure 5

Figure 6

Figure 7

Figure 8

Figure 9